



The Effects of PSPC on the Shipbuilding Industry

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I . Introduction

PSPC has already been adopted for over two years. During these periods, China shipbuilding industry has been paying high attention to the enforcement of the new coating standard, and has done a lot to get prepared for the new standards in many aspects, such as the addition and transformation of the facilities, the improvement of the construction process, technology and management level, and certification system of marine coating inspector etc. At present, China's shipbuilding enterprises have gradually started to build ships complied with PSPC . When shipbuilding enterprises sign new contracts, they all pay special attention to the new standard in order to avoid the major economic losses.

China's shipbuilding enterprises have improved equipments and facilities for PSPC, and also have enhanced the management and technology level. Therefore, the formal implementation of PSPC plays a certain promoting role in the development of China's shipbuilding technology.

But undoubtedly, the implementation of PSPC also increases the difficulties of the vessel's construction, especially the impact on the shipbuilding costs and construction period are very obvious.



II. the effects of PSPC on the shipbuilding industry

The coating standard for ballast tanks requires that the ship coating life increases from 5 years at present to 15 years, which changed a lot compared with the current standards and construction practices used in the ship paintwork. Ten key technical requirements in the coating standards are significantly improved, such as the secondary surface preparation, surface defect treatment, soluble salts limits before painting, dust level, dry film thickness control, the surface treatment after erection, coating inspectors qualifications, Coating pre-qualification test, shop primer requirements and coating technical files (CTF) etc. Therefore, the implementation of PSPC will have a significant impact on shipbuilding industry, and increase the difficulty of the ship construction, especially increase costs of shipbuilding. The detail are as follows:



II. the effects of PSPC on the shipbuilding industry

1. surface preparation (roughness, salt, sand, blasting level requirements and cleanliness etc.)

- 1) determine the new type and ratio of abrasive;
- 2) the adjustment of the related process parameters and the updating and maintenance of necessary facilities;
- 3) increase inspection of the first surface preparation.

Therefore, the cost increased at the stage of the first surface preparation than before.





II. the effects of PSPC on the shipbuilding industry

2. The certification of shop primer

After the certification, the price of the shop primer per liter increases.

3. the secondary surface preparation (roughness, salt, sand blasting level requirements and cleanliness etc.)

- 1) increase the coating facilities input;
- 2) increase the secondary surface preparation costs and prolong the construction period;
- 3) increase the inspection of the secondary surface preparation.



II. the effects of PSPC on the shipbuilding industry

4. edges treatment , the defect treatment of the structure surface

The requirements are high, the construction period and the inspection time of the secondary surface preparation are extended.

5. the coating system for the ballast tank

- 1) After certification the unit price of ballast tank coating rises;
- 2) the painting film thickens, and the quantity of theoretic paint increases;
- 3) construction period increases;
- 4) job of the thickness measurement increases.



II. the effects of PSPC on the shipbuilding industry

6. the surface treatment after erection and touch up

- 1) increase period of the ship designing and installation of outfitting production;
- 2) increase the equipment inputs of the vacuum blasting, and extend the construction time of paintwork;
- 3) increase the on-site inspection of the damage area.

7. the inspectors' qualification

- 1) increase full-time coating inspectors;
- 2) increase training cycles and costs.



II. the effects of PSpC on the shipbuilding industry

8. the submission and confirmation of CTF

The time of the designing, submission, verification and the certificate completion etc. are increased.

In addition, for the descriptive requirements of PSpC, because of the absence of specific quantitative requirements, ship-owners and shipyards have the different understanding. The excessively high standards and demands from owners bring the great difficulties to the on-site construction, which will result in the extension of the shipbuilding construction period and the production schedules.



III. the irrational contents in PSPC

1. The restriction requirements of the steel surface salt content

“PSPC requires that the soluble salt content of the steel surface should not be greater than 50mg/m^2 (equivalent to sodium chloride), ISO 8502-9”, it should be inspected at the stage of the primary surface preparation and surface repair of block.

We think it is more reasonable to revise the soluble salt requirements in PSPC standards from " 50mg/m^2 " at present to " 70mg/m^2 or according to the paint manufacturer's recommendations". The reasons are as follows:

- 1) The related ISO technical reports show that the range of steel surface soluble salt recommended by the majority of paint manufacturers is $70\text{-}100\text{mg/m}^2$ according to the marine environmental application coating systems.
- 2) Most of the test results in the relevant DE 49 documents show that the steel surface soluble salt content is among $10\text{-}70\text{mg/m}^2$, which almost has no impact on the coating adhesion and bubbling.
- 3) If the subsection salt content is more than $50\text{-}70\text{mg/m}^2$ and needs fresh-water washing, it will not only spend the scarce fresh water resources, but also have a great impact on the environmental protection, production cycle and construction costs. If the salt content of fresh water itself is higher, the cost is greater.



III. the irrational contents in PSPC

2. the requirements of steel surface roughness

PSPC requires that the roughness after the first and second surface treatment is among 30-75 μm . Through the investigation, at present the shipyards control the roughness after the first and secondary surface preparation between 30-100 μm to ensure the quality of surface treatment. It is difficult for shipyards to guarantee the quality of surface roughness as well as to meet the PSPC requirements in practical operation.

According to the long-standing anti-corrosion coating experience, the paint manufacturers usually recommend the steel plate whose roughness is between 30-100 μm to guarantee the coating quality. At present, in the actual ship operation there is no sufficient evidence to prove that the steel coating quality of roughness 75 μm is superior to that of roughness 100 μm .

According to the experience of coating manufacturers, we believe that the present value of the roughness in PSPC now is not reasonable. Therefore, the PSPC roughness requirements should be between 30-100 μm or based on the paint manufacturer's recommendations.



III. the irrational contents in PSpC

3. There are no specific quantitative implementation methods in PSpC standards requirements. Therefore, both the ship-owners and shipyards easily misunderstand the PSpC standards in the ship construction process, which will bring the great difficulties to the on-site shipyard construction.



IV. conclusions and recommendations

Asia's major shipbuilding countries should jointly submit the following proposals to IMO in order that the PSPC standards for the ballast tank are more rational, scientific and practical.

1. PSPC requires that the steel surface soluble salt content is not greater than 70 mg/m² (equivalent to sodium chloride), ISO 8502-9, or based on the paint manufacturer's recommendations;
2. The requirements of PSPC roughness should be between 30-100µm or based on the manufacturer's recommendations;



IV. conclusions and recommendations

3. The more specific quantitative PSPC Implementation Guideline should be established and promulgated to settle the on-site construction difficulties caused by the different understanding of the ship-owners and shipyards. For example, the range of butts doesn't belong to the damaged area; and the specific requirements of welds grinding etc.

The shipbuilding industry of China, Japan and Korea should continue to strengthen the communication and cooperation, and should take the unified action to jointly reply to PSPC standards as well as other new IMO standards aiming at shipbuilding countries.

